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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,286	02/16/2006	Takashi Fukuda	040302-0547	3477

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EXAMINER	
O'NEILL, KARIE AMBER	

ART UNIT	PAPER NUMBER
1795	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,286	FUKUDA, TAKASHI	
	Examiner	Art Unit	
	Karie O'Neill	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 December 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 February 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 17, 2007, has been entered.

Claims 1and 8 have been amended. Claims 9-11 have been added as new. Therefore, Claims 1-11 are pending in this office action.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-6 and 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Nonobe et al. (US 2002/0094467 A1).

With regard to Claim 1, Nonobe et al. discloses a fuel cell system comprising: a fuel cell (100) to be supplied with a gas for power generation through a mainstream passage (401), the gas unused for the power generation to be discharged out of the fuel cell (paragraph 0035); a circulation flow path (403) through which the gas discharged

out of the fuel cell is re-supplied to the fuel cell (paragraph 0035); a variable flow rate circulation pump (410) for circulating the gas through the circulation flow path, which is operative to adjust a flow rate of the gas in the circulation flow path (paragraph 0043); a valve (416) for discharging the gas in the circulation flow path to the outside of the circulation flow path through a relief passage (409) or a valve (414) provided in the drain passage (407) that diverges from the circulation passage (403) (paragraph 0053); a voltage sensor (not shown) for measuring voltage of the fuel cell (paragraph 0097); and a controller (50) for controlling the circulation pump (410) and the valves (414, 416) (paragraphs 0046 and 0042), wherein the controller (50) is configured to determine whether to increase the flow rate of the gas in the circulation flow path based on the voltage measured by the voltage sensor (paragraph 0097). If a rise in the voltage is detected, the controller then opens the shut off valve (414) to discharge circulating gas from the circulating path, which creates an increase in the flow rate and concentration of the circulating gas. The phrase, "the controller is configured to" is considered claim language that suggests or makes optional but does not require the steps to be performed. See MPEP 2111.04. Because the instant claims are product claims drawn to a fuel cell system, the language "the controller is configured to determine whether to increase the flow rate of the gas in the circulation flow path or to open the valve based on the voltage measured by the voltage sensor" is functional language and imparts intended use to the structural features of the product. Therefore, while the intended use language of the claim has been considered, it is not given patentable weight because it is directed to a process and not directed to the structural features of the product.

Nonobe et al. teaches a fuel cell, a circulation flow path, a pump, a valve, a voltage sensor and a controller, which are the same structural limitations claimed in the instant invention. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997). A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

With regard to Claims 2 and 3, Nonobe et al. discloses, the fuel cell having a stacked structure formed by stacking or laminating a plurality of unit cells together (paragraph 0031), and a voltage sensor measuring the voltage of respective cells (paragraph 0097). Nonobe et al. discloses an open-end voltage of the fuel cell (100) being immediately raised to a predetermined level. The controller (50) then detects the rise of the open-end voltage of the fuel cell based on an output signal received from a voltage sensor. The controller (50) proceeds to open the shutoff valve (414) to increase the amount of circulating gas discharged through drain passage (407), thereby reducing the flow rate of the gas circulating through the circulating path (403) and pump (410). Nonobe et al. does not disclose the average voltage of the cells becoming lower, however, it is inherent that as the rate of gas flow through the circulation path (403)

back to the fuel cell (100) decreases, the voltage of the cells will also decrease, due to lack of gas provided to generate electrical power.

With regard to Claims 4-6, Nonobe et al. discloses, the fuel cell having a stacked structure formed by stacking or laminating a plurality of unit cells together (paragraph 0031), and a voltage sensor measuring the voltage of respective cells (paragraph 0097). Nonobe et al. discloses a controller (50) for controlling operation of the circulation pump (410) so that the flow rate or speed of the hydrogen gas through the circulation path (403) varies depending upon an amount of consumption of the electric power generated by the fuel cell (paragraph 0046). Nonobe et al. also disclose, if the hydrogen off-gas is returned to the fuel cell (100) via the pump (410), the moisture or water contained in the hydrogen off-gas is not vaporized sufficiently, and, as a result, the moisture supplied to the fuel cell may adhere to the walls in the unit cells of the fuel cell stack, possibly resulting in clogging of hydrogen-gas channels in the fuel cell. If the channels are clogged, output voltage of the unit fuel cells of the fuel cell stack is reduced, resulting in a reduction in electric power generated by the fuel cell as a whole (paragraph 0048). Nonobe et al. also discloses the circulation pump (410) being variably controlled by the controller (50) so that the flow rate of the hydrogen gas through the circulation passage (403) depends on the consumption of the electric power generated by the fuel cell and when the circulation path is not clogged, less impurities are present and less hydrogen needs to flow through the paths to push out the impurities (paragraphs 0045-0048).

With regard to Claims 8 and 10, Nonobe et al. discloses a method wherein the fuel gas unused for the power generation is re-supplied to the fuel cells through a fuel gas circulation system (403) (paragraph 0035) which includes a variable flow rate circulation pump (410) operative to adjust a flow rate of the fuel gas circulating through the fuel gas circulation system (paragraph 0043) and a valve (416) for discharging the fuel gas in the fuel gas circulation system to the outside of the circulation flow path through a relief passage (409) or a valve (414) provided in the drain passage (407) the diverges from the circulation path (403) thereof (paragraph 0053), the method comprising: monitoring output voltages of the respective fuel cells (paragraph 0097); determining whether to increase the flow rate of the fuel gas in the fuel gas circulation system (403) or to open the valve (414) based on the monitored output voltages; controlling the variable flow rate circulation pump (410) to increase flow rate of the fuel gas in the fuel gas circulation system (403), if some of the monitored output voltages are out of a predetermined range which includes an average value of the output voltages of the respective fuel cells; and opening the valve (416) to discharge discharging the fuel gas out of the fuel gas circulation system through exhaust line (409), if some of the monitored output voltages are within the predetermined range and the average value of the output voltages of the respective fuel cells is lower than a predetermined value. Nonobe et al. discloses an open-end voltage of the fuel cell (100) being immediately raised to a predetermined level. The controller (50) then detects the rise of the open-end voltage of the fuel cell based on an output signal received from a voltage sensor. The controller (50) proceeds to open the shutoff valve (414) to increase

the amount of circulating gas discharged through drain passage (407), thereby reducing the flow rate of the gas circulating through the circulating path (403) and pump (410). Nonobe et al. does not disclose the average voltage of the cells becoming lower, however, it is inherent that as the rate of gas flow through the circulation path (403) back to the fuel cell (100) decreases, the voltage of the cells will also decrease, due to lack of gas provided to generate electrical power.

With regard to Claim 9, Nonobe et al. discloses the controller (50) is configured to control the circulation pump (410) to increase the flow rate of the gas in the circulation flow path (403) if the measured voltages are lower than a predetermined range. Upon start up of the fuel cell system, when voltages are below a predetermined value, the pump (410) is driven to forcedly circulate the hydrogen gas through the fuel cell system (paragraph 0099). The valve (414) is open if the voltage of the cells is below a predetermined level, in order to evacuate any impurities that are in the system (paragraph 0097). The instant claims are product claims; i.e. a fuel cell system. The language, "the controller is configured to control the circulation pump to increase the flow rate of the gas in the circulation flow path and to open the valve if some of the measured voltages are within the predetermined range and the average value of the voltages of the respective cells is lower than a predetermined value" is functional language and imparts intended use to the structural features of the product. Therefore, while the intended use language of the claim has been considered, it is not given patentable weight because it is directed to a process and not directed to the structural features of the product. Nonobe et al. teaches the same structural limitations as

claimed in the instant invention. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997). A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

With regard to Claim 11, Nonobe et al. discloses a fuel cell system comprising: a fuel cell (100) to be supplied with a gas for power generation through a mainstream passage (401), the gas unused for the power generation to be discharged out of the fuel cell (paragraph 0035); a circulation flow path (403) through which the gas discharged out of the fuel cell is re-supplied to the fuel cell (100) (paragraph 0035); a variable flow rate circulation pump (410) for circulating the gas through the circulation flow path (403), which is operative to adjust a flow rate of the gas in the circulation flow path (paragraph 0043); a valve (416) for discharging the gas in the circulation flow path to the outside of the circulation flow path through a relief passage (409) or a valve (414) provided in the drain passage (407) that diverges from the circulation passage (403) (paragraph 0053); a voltage sensor (not shown) for measuring voltage of the fuel cell (paragraph 0097); and a controller (50) for controlling the circulation pump (410) and the valve (414), wherein the controller (50) is configured to control the circulation pump (410) to forcedly increase the flow rate of the gas in the circulation flow path (403) if the voltage

measured by the voltage sensor becomes lower than a predetermined value. This occurs upon start up of the fuel cell system (paragraph 0099) when the voltage is less than a predetermined level. The controller (50) is also configured to open the valve (414) thereafter if the voltage measured by the voltage sensor does not recover to the predetermined value. The valve (414) is opened so as to expel any impurities that have accumulated in the system and have slowed the electric power output (paragraph 0097). The instant claims are product claims; i.e. a fuel cell system. The language, "the controller is configured to control the circulation pump to increase the flow rate of the gas in the circulation flow path if the voltage measured by the voltage sensor becomes lower than a predetermined value, and to open the valve thereafter if the voltage measured by the voltage sensor does not recover to the predetermined value" is functional language and imparts intended use to the structural features of the product. Therefore, while the intended use language of the claim has been considered, it is not given patentable weight because it is directed to a process and not directed to the structural features of the product. Nonobe et al. teaches the same structural limitations as claimed in the instant invention. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997). A claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the

prior art apparatus teaches all the structural limitations of the claim. *Ex parte Masham*, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987).

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nonobe et al. (US 2002/0094467 A1), as applied to Claims 1-6 and 8-11 above, and in further view of Barton et al. (US 6,960,401 B2).

Nonobe et al. discloses the fuel cell system in paragraph 3 above, but does not disclose wherein the valve is controlled to increase an amount of gas to be discharged if a rate of increase is in the measured voltage is kept below a predetermined rate while, the circulation pump is being controlled to increase a flow rate of the gas circulated more than that in a normal operation.

Barton et al. discloses a fuel cell purging method and apparatus in which a significant drop in the voltage across one or more of the fuel cells requires a purge valve to open (column 12 lines 1-10). Therefore, at the time of the invention it would have been obvious to one of ordinary skill in the art to increase the circulated flow gas to a value above normal operation in order to force the fuel inside the fuel cell to flow out of the discharge valve as a result of the pressure increase in the circulation line, because Barton et al. teaches this method as a way to discharge fuel from the fuel cell as a result of abnormal operation.

Response to Arguments

5. Applicant's arguments, see pages 6-7, filed December 17, 2007, with respect to the rejection(s) of claim(s) 1-6 and 8 under 35 U.S.C 103(a) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Nonobe et al. (US 2002/0094467).

Applicant's principal arguments are:

(a) In Nonobe, the shut-off valve (414) is periodically opened to discharge hydrogen gas containing the impurities or the moisture leaking from the oxygen electrode side (see, [0053]). This opening of the valve (414) is performed on a periodic basis, and is not based on the output voltage of the unit cells of the fuel cell (100).

In response to Applicant's arguments, please consider the following comments:

(a) The claim limitations do not recite how often the valve is opened to discharge the gas from the circulation flow path. Therefore, it is not relevant if the valve in Nonobe et al. is opened on a periodic basis as long as it is performing the function of discharging the gas. Nonobe et al. also discloses in paragraph 0097 the controller detecting the rise in the open-ended voltage of the fuel cell system. When this occurs, the controller then proceeds to open the valve (414) to gradually discharge the circulating hydrogen gas. Therefore, the opening of the valve is based in the voltage output of the fuel cell system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill whose telephone number is (571)272-8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Karie O'Neill
Examiner
Art Unit 1795

KAO

/Mark Ruthkosky/

Primary Examiner, Art Unit 1795